Ministry of education and science of Ukraine
Poltava National Technical Yuri Kondratyuk University
Department of oil and gas recovery and geotechnics

GEOLOGICAL SURVEYING LOG

for students of specialty
192 construction and civil engineering,
Educational level „bachelor" (full-time study)

Poltava 2017

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Ministry of education and science of Ukraine
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Geological Surveying Log

Student of ..... group civil engineering faculty

Crew

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Chief of practice _____

_____

The practice was carried out
since _____
till _____

Content

1. INSTRUCTIONS FOR THE EXECUTION, LOGGING AND PROTECTION OF THE REPORT ON ENGINEERING GEOLOGICAL PRACTICE. THE ORDER OF CARRYING OUT THE OFFSET

The purpose of the engineering-geological practice of students of the second year of the above-mentioned specialties studying in the direction of "Construction" is the consolidation of knowledge from the course "Engineering Geology", as well as their mastery of practical skills and techniques for the detection of signs in the field of adverse geological processes and engineering -geological phenomena, determination of indicators of physical and mechanical properties of soils and their analysis.

In practice, students study geological and engineering-geological features of the practice area, gain experience in selecting, preserving, transporting soil samples, using some field and laboratory methods for determining the physical properties of soils. During the work, trainees use equipment and instruments that are intended for engineering and geological exploration.

Before the beginning of practice, as well as in its process, the chief conducts the surveying safety training.

The log on engineering geological practice is being filled in during its implementation and must have a brief description of the objects or works that were observed during the passage of the tour or other work practices of practice. The log should have clear diagrams, drawings, scemes or photographs.

If necessary, you can stick additional sheets to the magazine for further filling them with text or illustrations.

In the course of the training, the team brings to the chief a completed, high-quality log, and crew answer the questions about works that were carried out during practice.

2. EXCURSIONS

Date .....

The following pages of the log provide a detailed description of the routes of excursions and works that were observed during their passage. To do this, use the information that students received from the chief, as well as from literary sources.

The section includes sketches or photographs of natural debris, ravines, landscaping circuses, river valleys, buildings and structures that have undergone deformation through manifestations of exogenous geological processes and dangerous engineering-geological phenomena, etc.

3. STUBBLE WORK AND SELECTION OF SOIL SAMPLES OF BROKEN OR UNDAMAGED STRUCTURE

Date .....

Aim – .....
.....
Tools …….....
.....
.....

Selection of samples of broken and undisturbed structure. Conservation of samples and monoliths (*painted and signed*).

Information on the main set of instruments of field express laboratory of prof. I.M. Litvinov, FLL-9 (paint or photograph and sign).

Selection of samples of undisturbed structure with the equipment of the basic set of laboratory FLL-9 (painte or take pictures).

Soil samples in compression rings or beaks are weighed in a stationary laboratory with accuracy up to 0.01 g, and the results are entered in the table. 4 (p.18). After weighing, the samples are dried in a drying cabinet.

Log

Work initiated ....., completed .....
Location .....

Top marker .....
Location .....
Cross section .....
Depth ..... m.

Table 1

Sample #	Features of breeds (color, density, humidity, presence of inclusions, impurities, etc.)	Depth of sampling, m	Layer depth, m		Layer length, m	Water level, m, after	
			from	to		appear	setting

4. DRILLING AND SAMPLING OF WELLS

Date .....

The purpose of drilling works in engineering geological surveys – .....
.....
.....
.....

Equipment used for drilling operations.

A. Manual drilling.

Depth ..... Well diameter .....

Technique .....

Components of a hand-made storm (draw or photograph, to sign).

Б. Mechanized drilling using the search drilling set (SDS-15).

Depth ..... Well diameter .....

Technique .....

Components of a drilling set (draw or photograph, to sign).

Drilling log

Well # ..... Top marker .....
Location .....

Depth ..... m. Diameter ..... mm.
Work initiated ....., completed .....

Table 2

Sample #	Features of breeds (color, density, humidity, presence of inclusions, impurities, etc.)	Depth of sampling, m	Layer depth, m		Layer length, m	Water level, m, after	
			from	to		appear	setting

5. DETERMINATION OF SAND FILTRATION COEFFICIENT IN FIELD CONDITIONS

The date of the experiment.....

The purpose of establishing the soil filtration coefficient is – .....

.....

.....

Equipment for determining the soil filtration coefficient is device PVN (Painted or photographed and signed).

The sequence of fieldwork (*Write down*)

Field journal to study the filtration properties of the soil

Table 3

№	Time		Time interval between measurements		The amount of water spilled over the time taken, l	Water consumption	
	hour	min	hour	min		l/min	m^3/day
1							
2							
3							
4							
5							
6							
7							
8							

Notation: 1 day = 1440 min.; 1 m^3 = 1000 liters.

Graph of dependence of filtering water consumption on time (*Vertical axis - filtration water consumption, m^3/day; gorizontal – hour, min.*)

6. CAMERAL WORKS

The date of the experiment.....

A. Determination of the density of mineral soil particles

Devices and materials

1. A pycnometer.
2. Glass funnel.
3. Scales technical.
4. Electric hot plate.
5. Distilled water.
6. Samples of air-dry soil.
7. Stump.
8. Sieve № 1.

To prepare the experiment, the soil samples are crushed in a porcelain stump and sifted through a sieve with apertures of 1 mm.

The sequence of the experiment (*Write down*)

Output data and calculation

Mass of empty pycnometer g_n .....g.

Mass of pycnometer with a weight of soil g_{n2}.....g.

Soil mass $g_1 = g_{n2} - g_n$ .....g.

Mass of pycnometer with soil and water, poured to the mark g_2 .....g.

Mass of pycnometer with water, poured to the mark g_3.....g.

Incorporation of correction for hygroscopic moisture (the value of hygroscopic moisture (W_2) is given by the teacher)

$$g_0 = \frac{g_1}{1 + W_2} = \text{----------} = \quad \text{g.}$$

The density of mineral soil particles

$$\rho_s = \frac{g_0}{(g_0 + g_3) - g_2} \cdot \rho_w = \text{----------} = \quad \text{g/cm}^3.$$

$\rho_w = 1{,}0$ g/cm^3 – water density.

B. Determination of granulometric composition of clay soil by field method (Rutkovskii)

B.1. Determination of the composition of clay particles (diameter $\leq 0{,}005$ mm)

Devices and materials

1. Measuring cylinder capacity 50 sm^3.
2. Mixer (metal or glass rod with a rubber tip).
3. Coagulator (solution $CaCl_2$).
4. Prepared powder of clay soil.
5. Water.
6. Capacity for fusion water.

The sequence of the experiment (*Write down*)

Output data and calculation

Initial volume of soil $V_0 = 5{,}0$ cm^3.

Volume of soil after swelling V_1 = ... cm^3.

To increase the volume by 1 cm3 of the original value

$$K = \frac{V_1 - V_0}{V_0} = \text{----------} = \quad .$$

The content of clay particles $F = 22{,}7 \cdot K =$ ..... %.

B.2. Determination of the composition of sand particles (diameter $\geq 0{,}05$ mm)

Devices and materials

1. Measuring cylinder capacity 100 cm^3.
2. Mixer (metal or glass rod with a rubber tip).
3. Stopwatch.
4. Prepared powder of clay soil.
5. Water.
6. Capacity for fusion water.

The sequence of the experiment (*Write down*)

Output data and calculation

Initial volume of soil $V_0 = 10$ cm^3.

Sediment volume after complete clarification of water V_1 = ... cm^3.

Each cubic centimeter of soil that is introduced into the measuring cylinder corresponds to 10% of the soil. Therefore, the amount of sand particles is determined after multiplying the amount of sediment by 10%

$$Y = V_1 \cdot 10\,\% = \text{..... } \%.$$

B.3. Determination of the composition of dust particles

(diameter by 0,005 to 0,05 mm)

To calculate the composition of dust particles it is necessary to subtract from the 100% total amount of clay and sand particles:

$$Z = 100\,\% - (F + Y) = \text{..... } \%.$$

Thus, according to the classification V.V. Ohotina, soil belongs to..... (for reference: sandy loam $F \le 10\,\%$; loam $F = 10 \div 30\,\%$; clay $F > 30\,\%$).

C. Determination of indicators of physical properties of the soil

C.1. Soil density calculation

Using samples taken from the technical (shell or well) through the cutting rings, the density of the soil is determined as

$$\rho = \frac{G_1 - G_{á}}{V} = \text{----------} = \qquad \text{g/cm}^3,$$

where G_1 – sample mass with a ring (weighing bottle), g;

$G_{á}$ – mass of a ring (weighing bottle), g;

V – Ring volume, cm^3.

The calculation results are entered in column 9 of table 4.

Note. The volume of the compression ring from the set of the express laboratory of Litvinov is $V = 50$ cm^3.

C.2. Determination of soil moisture

After drying the samples in the drying cabinet drying oven at $t = 105^{\circ}$ C the samples are weighed on technical scales and calculate the soil moisture by the formula

$$W = \frac{G_1 - G_2}{G_2 - G_{á}} = \text{----------} = \quad ,$$

where G_2 – Mass of dried sample with a ring (weighing bottle), g.

If necessary, the moisture of the soil can be determined as a percentage.

The calculation results are entered in column 10 of table 4.

C.3. Calculation of the density of the dry (skeleton) soil

The density of dry soil ρ_d is calculated according to the following expression, using already established values ρ and W:

$$\rho_d = \frac{\rho}{1 + W} = \text{----------} = \quad \text{g/cm}^3.$$

The calculation results are entered in column 11 of table 4.

C.4. Determination of the porosity coefficient of the soil

The coefficient of soil porosity is calculated according to one of the formulas:

$$e = \frac{\rho_s}{\rho} \cdot (1 + W) - 1 = \text{---------} \cdot (1 + \quad) - 1 = \quad \text{or}$$

$$e = \frac{\rho_s - \rho_d}{\rho_d} = \text{----------} = \quad .$$

The density of mineral soil particles ρ_s is taken on the basis of the results of the cameral work A. The results of the calculation are made to column 12 of Table 4.

C.5. Calculation of the water saturation coefficient of the soil

The water saturation coefficient of the soil is determined by expression

$$S_r = \frac{\rho_s \cdot W}{\rho_W \cdot e} = \text{----------} = \quad .$$

The constituent formulas are taken separately for each sample according to preliminary calculations. The results of calculations are added to column 13 of table 4.

Table 4

Determination of basic and derived indicators of physical properties of the soil

№ hole	Depth of selection, m	№ ring (weighing bottle)	mass of a ring (weighing bottle), $G_{á}$, g	mass of a ring (weighing bottle), g		mass of a soil, g		Soil density ρ, g/cm^3	Humidity W	Density of the dry soil ρ_d, g/cm^3	Porosity coefficient e	Water saturation coefficient S_r	Notes
				wet G_1	dry G_2	wet	dry						
1	2	3	4	5	6	7	8	9	10	11	12	13	14

7. LITERATURE

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